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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/533,427  
Filing Date: January 17, 2006  
Appellant(s): HETHCOCK ET AL.

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Daren Davis  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed July 21, 2009 appealing from the Office action mailed October 20, 2008.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows: Whether claims 22-26 are properly rejected under 35 USC 102(b) as anticipated by or in the alternative under 35 USC 103(a) as obvious over Sidles.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

4,888,228                                      Sidles                                      12-1989

Definition of "infusing" from Dictionary.com.

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 22-26 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sidles.

Sidles suggested that those skilled in the art would have bonded at least two composite performs together comprising providing at least two composite performs having composite fibers extending in an x-y plane, see plies 15 and 20 which included a base having warp and weft filaments 24 and 26. The reference taught that one skilled in the art would have inserted discrete fibers through each perform generally in a z-direction with loops protruding outward from each perform, see fibers 30 which extend in loops 32 and column 2, lines 20-24. The reference to Sidles stated that:

"The fibers may form loops on either side by tuft insertion techniques known to the art or the loops may be ground or cut on one or both sides of the tufts."  
(column 4, lines 27-30).

The reference clearly suggested that continuous fibers were tufted through the assembly and one side of the loops cut or "tuft insertion techniques known to the art" were used to insert the Z-direction fibers in the assembly (such known tuft insertion techniques clearly included insertion of discrete fiber tufts into the assembly as an alternative to insertion of a continuous fiber followed by severing one side of the same). The reference taught that those skilled in the art would have overlapped the exposed z-

Art Unit: 1791

direction fibers and loops from one preform with the exposed z-direction fibers and loops of the other preform, see column 2, lines 45-59. The reference taught that an organic binder was supplied to the performs and the organic binder formed a matrix upon application of heat and pressure to the assembly for the plies so arranged, see column 2, lines 60-column 3, line 4. At column 2, line 60-column 3, line 4, the reference states:

"Upon the application of proper conditions, i.e., heat and pressure, the binder 40 sets to form a matrix which substantially impregnates the plies. To the extent that the binder 40 is located between the plies, it can be said to be "sandwiched" between the plies. Of course it should be understood that this term contemplates complete saturation as well as discrete layers of binder and ground cloth and all degrees of penetration therebetween. By "substantially impregnates" it is anticipated that the matrix will substantially fill the interstices between the fibers. It is preferred that the composite has no porosity and that the matrix saturates the substrate 22. " (emphasis added).

The reference additionally taught that the binder material saturated the assembly completely where at column 4, lines 36-42 the reference stated:

"An adhesive or binder layer is spread-coat on one side of the substrate in an amount sufficient to completely saturate the substrate but still allow the fiber tips to make physical contact with the fiber tips of an opposing ply. It is desirable that the binder have a viscosity such that upon warming it will penetrate around the individual fibers." (emphasis added).

The reference to Sidles clearly taught "infusing a resin material through each preform and the overlapped Z-direction fibers and loops" as the term "infusing" is not clearly defined in the specification (note that as "infusing" pertains to the claimed invention in the disclosure the discussion of "infusing" is limited to that described with reference to Figures 13-15 of the disclosure and the entirety of the disclosure does not expressly

Art Unit: 1791

recite what is meant by "infusing") and it is given its ordinary and common meaning (note that it is reasonable without taking the term out of context to give the term its broadest reasonable interpretation and the Office is NOT taking an unreasonable definition of the term in the context of the application) as defined by Dictionary.com is taken to include "to introduce, as if by pouring; to cause to penetrate" (Dictionary.com Unabridged), "To put into or introduce as if by pouring" , "To fill or cause to be filled with something" (American Heritage Dictionary). Clearly, the reference to Sidles suggested "infusing" the resin or binder into the assembly within the meaning of the term. The matrix is cured in the assembly, column 3, lines 66-column 4, line 1. It should be noted that while the reference depicted the cut fibers being integrated with the fibers of the loops in Figure 3, the reference taught that two fabric preforms both of which carried loops therein or loops as well as cut loops (tufts) would have been useful in the process, see column 30-45. In such situations, one skilled in the art would have understood that in order to be "cooperating" within the meaning of the term defined by the reference the fibers of the loops in one ply would have come into the vicinity of the loops of the other ply in accordance with the teachings of the reference. Additionally, the severing of the loops of fibers to form loops on one side and tufts on the opposed side would have resulted in discrete fibers being integrated into the base fabrics (and thus insertion of discrete fibers therein). It should be noted additionally regarding the insertion of the discrete fibers that the reference clearly expressed that known tuft insertion techniques in the art would have been useful for insertion of the loops of material which included formation of the tufts with discrete fibers. It should additionally be noted that insertion of

Art Unit: 1791

a continuous length fiber followed by severing the same is in fact insertion of discrete fiber into the fabric plies as the claims do not exclude the subsequent cutting step.

While one may view this as an after step (and the insertion not being an insertion of discrete fibers but rather an insertion of continuous fiber which were made discrete subsequent to the inserting operation, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ discrete fibers which were inserted into each perform in order to form a perform useful for making a composite article having high interlamina strength as suggested by Sidles.

With respect to claims 23-26, the reference taught that the discrete fibers which were introduced into the base fabric as loops included glass fibers, carbon fibers (graphite) as well as polymer fibers, see column 3, lines 5-13. It should be noted that s-glass is a well known and common form of glass fiber employed in composite manufacture and that one skilled in the art would have found it obvious at the time the invention was made to select s-glass from the available glass fibers to perform the inserting operation. It being noted here that the rejection of claim 24 is based solely upon obviousness (and not anticipation). The same is true for claim 25, where graphite is a form of carbon commonly used in composite manufacture. Certainly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select graphite as the fiber material in the manufacture of the composite perform in light of the known use of graphite as a carbon material in composite manufacture in light of the teachings of Sidles to employ carbon fibers.

**(10) Response to Argument**

With respect to the patentability of the claims over the reference to Sidles as it relates to the rejection under 35 USC 102(b), the appellant has made essentially two arguments for the patentability of the claims: (1) the reference failed to teach or suggest the insertion of discrete fibers into the X- and Y- direction reinforced fabric plies, and; (2) the reference failed to teach the “infusing” of a resin material through each perform. With respect to the rejection under 35 USC 103(a), the appellant essentially repeated the arguments as they pertain to the 102(b) rejection and essentially took the position that the reference did not provide all of the elements of the claim in such a way to yield predictable results, did not suggest a simple substitution of one known technique or element for another that provided predictable results, did not suggest known techniques used to improve similar methods which yielded predictable results, did not select from a finite number of identified predictable solutions with a reasonable expectation of success, did not provide a known work in a field of endeavor used based on design or market forces where the variations are predictable to one skilled in the art and lastly failed to teach, suggest or provide motivation to one skilled in the art to modify Sidles commensurate with the claimed invention. As such, essentially as it relates to the rejection under 35 USC 103(a), the appellant is arguing that Sidles did not meet the criteria established in KSR to make a proper rejection under 35 USC 103(a). These arguments are respectfully traversed below.

As it pertains to the 102(b) rejection, it should be noted that Sidles did in fact suggest the inserting of discrete fibers through each perform generally in the Z-



Art Unit: 1791

direction. As expressed above, Sidles taught that one employed an operation whereby "tuft insertion techniques known in the art" were employed to insert discrete fiber tufts into the substrate having X- and Y-"direction reinforcement or "loops may be ground or cut on one or both sides to form tuft" (see column 4, lines 21-35). Sidles thus taught that discrete fiber tufts were inserted into the base substrates. Additionally, if one viewed the alternative to the known tuft insertion techniques in the art (note the emphasis of the term "or" above) one skilled in the art would have likewise understood that discrete fiber were inserted into the plies to form loop" by insertion of a continuous fiber followed by cutting to form the discrete fibers. The claims as presented do NOT exclude such a cutting step in the insertion of discrete fiber into the base plies. As such, not only is the insertion of discrete fibers through each preform taught by the "tuft insertion techniques known in the art" but it is also taught by the alternative insertion technique where a continuous fiber was inserted followed by cutting the continuous fiber (which results in the insertion of discrete fiber in the performs). Appellant's argument to the contrary is not well founded. Even if one views the conventional tuft insertion techniques as not expressly teaching insertion of discrete fibers into the preforms, it certainly would have been obvious to one of ordinary skill in the art to employ conventional tuft insertion techniques to insert discrete loops of material into the performs such as those techniques used to make hand made rugs and carpets. There is no reason to believe that Sidles did not direct one skilled in the art at the time the invention was made to employ such known tufting techniques which included insertion of discrete fibers into the performs. Additionally, one would have understood how to do the same and would have

Art Unit: 1791

understood what the predictable results would have been from insertion of the discrete fibers therein.

As to the “infusing” step of the claim, the appellant attempts to define “infusing” in a limiting manner with the definition and/or description from “Fundamentals of Composites Manufacturing” to mean that dry fiber performs are placed in a mold and the mold is closed followed by resin injection into the mold so that the perform is wetted with resin. The appellant was advised in the final rejection that this is certainly one reasonable interpretation of the term “infusing” in the context of the claimed invention but that it was not the only reasonable interpretation of the term “infusing”. It should be noted here that there is no place in the disclosure of the specification where appellant defined what was meant by “infusing” or “infusion” (i.e. the term “infusing” or “infusion” as used herein means...). There is no clear and concise language set out in unambiguous terms as to the exact meaning of the term in the context of the disclosure. Additionally, in this regard there is no discussion in the disclosure of dry performs being infused with resin in a mold by injection of resin into the mold so that the preform is fully wetted with the resin. There simply is no support for the definition appellant seeks to impart to the term in the specification. In such circumstances, it is reasonable for the Office to seek out what one of ordinary skill in the art would have understood the term “infusing” to mean within the broadest reasonable meaning of the term. As discussed above the term “infusing” means “to introduce as if by pouring; to cause to penetrate” , “to put into or introduce as if by pouring”, as well as “to fill or cause to be filled with something”. As the reference to Sidles substantially impregnated the plies and clearly

Art Unit: 1791

defined "substantially impregnate" to mean that "it is anticipated that the matrix will substantially fill the interstices between the fibers" (column 2, lines 60-column 3, line 4) where the conditions of heat and pressure (as well as the viscosity of the resin) are such that the resin "will penetrate around the individual fibers" (column 4, lines 36-49), the reference to Sidles clearly envisioned that the resin was introduced into the assembly and was caused to penetrate there into with the application of heat and pressure. The reference to Sidles additionally taught that the preforms were filled with the resin as the resin penetrated into the same and voids were removed from the assembly. If appellant had provided a definition as to what was meant by "infusing" perhaps the conclusion would be different, however the facts remain that no such definition was provided. Additionally there is no disclosure of resin infusing which included injection of resin into the preform while the preform was retained in a mold and the preforms being dry prior to injection of the resin as the description provided by appellant by the "Fundamentals of Composites Manufacturing" book which described "Resin Infusion Technologies". In other words, there is no clear indication that the original disclosure was limited to the definitions of "infusing" which appellant wishes the term to mean. There is no guidance that it means injection of resin into dry preforms disposed in a mold. Under such circumstances meaning given to the term identified by the examiner is deemed reasonable. Note that penetration of resin to fill the voids in the fabric preform is a reasonable meaning given to the term in the context of the claim and disclosure and that the reference to Sidles clearly suggested the same. The appellant's

Art Unit: 1791

arguments regarding the meaning of the term "infusing" and whether the reference to Sidles taught the same are respectfully traversed for the reasons identified.

As to the rejection under 35 USC 103(a), those arguments presented which relate to the insertion of discrete fibers and infusing of the matrix have been addressed above. It should be noted that the only "modification" suggested to be made in Sidles related to the insertion of the Z-direction discrete fibers into the performs. The appellant argues that there is no insertion of discrete fibers through each perform so as to form exposed fibers and loops protruding outwardly from the preforms. The appellant is advised as expressed above that: (1) insertion of a continuous fiber to form loops on both sides of the fabric base followed by cutting the loops is in fact inserting discrete fibers through the perform (the claims do NOT exclude a cutting step as part of the insertion of the discrete fibers); (2) the reference to Sidles taught that conventional well known tufting techniques would have been suitable for the insertion of the loops into the performs and as noted above such conventional techniques included the use of discrete fiber insertion in tufting as like when one forms tufts by hand in the manufacture of hand made rugs and/or carpets (note that the use of conventional tufting techniques was identified by Sidles as an alternative technique to using a continuous thread and cutting or grinding to form discrete fibers), and; (3) that insertion of discrete fibers into the preform whether initially in the form of discrete fiber or continuous length fiber which was severed (alternatively disclosed) perform have been obvious to those skilled in the art as the discrete fibers having exposed fiber on one side and loops on the other were clearly provided by Sidles and the manner in which one provided the same would have

Art Unit: 1791

been within the purview of the ordinary artisan. There simply is no substitution or modification which need be made in Sidles which would have yielded expected results. One would have been expected to know how to insert discrete fibers into the perform to form the structure of Sidles having loops on one side and exposed fibers on the other (as such was desired by Sidles) and it the expected results merely would have been a preform which was capable of being interlocked with another preform via the exposed fibers which were in the Z-direction. While the reference to Sidles did not expressly state one employ graphite or S-glass fibers as the discrete fibers, as noted above, the reference did express that glass fibers would have been useful and one skilled in the art would have understood that S-glass was a commonly known form of glass fiber used in composite article manufacture (appellant has never refuted this from the non-final rejection). Additionally as it pertains to graphite fibers, as also noted in the non-final rejection, graphite fiber is a form of carbon fiber which was known for use in composite article manufacture and which again was suggested by Sidles. Clearly use of graphite as well as S-glass materials as the fiber material in composite manufacture in accordance with Sidles was not only expressly suggested by the reference (as its use is included within the genus of carbon as well as glass fibers) but it certainly would have been obvious to employ such conventionally known (never denied by appellant) reinforcing materials in the composite articles of Sidles.

For the reasons noted above, it is deemed that Sidles not only taught inserting discrete fibers into the performs (or in the alternative rendered such insertion obvious) but also suggested the infusing of a resin matrix within the preforms (within the common

Art Unit: 1791

and known reasonable meaning given to the term “infusing”) and the rejections as presented should be sustained.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner’s answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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